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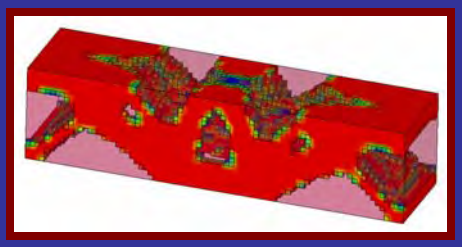
Engineering Journal and Website Resource

NOVEMBER 2009

11th Int'l LS-DYNA Conf. Sponsorship / Booths



LS-OPT® / Topology released

1st time held In China Advanced LS-DYNA Crashworthiness Simulation by Paul A. Du Bois

AVI Showcase BirdStrike Courtesy of:

X3DCAE

Presentation

LSTC Dummy & Barrier Models

Dr.Anupam Pal, IIT,Kanpur India
Article: Muscle Tone in Human Stomach

Announcements

LSTC Conference Announcements

Abstract deadline has been extended through January 14th, 2010

LSTC's sponsorship / booth brochure is available:

Contact: vic@lstc.com or wlm@lstc.com .

LSTC released a topology design product

LSTC has released the first version of the EuroSID-2re and EuroSID-2 models

X3Dcae LLC is the first and only CAE firm in West Virginia performing Finite Element Analysis with LS-DYNA since 2006 and has provided two AVI's for the AVI library on BirdStrike

Sincerely,

Marsha J. Victory
President, FEA Information Inc.

Table of Contents

FEA Information

Platinum

Participants

OASYS Ltd: http://www.oasys-software.com/dyna/en/	**JSOL Corporation**: http://www.jsol.co.jp/english/cae	**HP**: http://www.hp.com/
ETA: http://www.eta.com	**INTEL**: http://www.intel.com	**ESI Group**: http://www.esi-group.com
BETA CAE Systems S.A.: http://www.beta-cae.com	**APTEK**: http://www.aptek.com	**SGI:** http://www.sgi.com
NEC: http://www.nec.com	**Voltaire:** http://www.voltaire.com	**CRAY**: http://www.cray.com
LSTC: http://www.lstc.com		

Presentation Part 1

LSTC Dummy/Barrier Models

By: M. Victory,
LSTC Global Business Administrator

Four years ago LSTC decided to begin the process of developing finite element models of dummies and barriers. As part of this development, we had the idea of employing state-of-the-art capabilities which are unique to LS-DYNA including meshless solid and shell elements to improve robustness, smooth contact to model joints, and advanced constitutive models to model the complex behavior of hyperelastic materials including aging. This work is now well underway, and its current limited success can be attributed not only to the work of the National Crash Analysis Center (NCAC), DYNAmore GmbH, and the dedicated LSTC engineers, but to several automotive suppliers and OEMs who have been critical in supplying surface data, test and validation data and feedback related to the performance of our models.

We are still in the early stages of our dummy developments, and much effort is required before our ultimate goals are achieved. We have committed to funding NCAC for the third year to accelerate our developments. More recently, DYNAmore GmbH in Germany joined LSTC and committed their efforts to the development and validation of the EuroSID dummies.

Currently, our new detailed dummy models have between 200,000 to 300,000 elements, but can be easily refined in the future as accuracy requirements increase. The dummies generated at LSTC use the advanced parametric meshing features available in True*Grid* developed by XYZ Scientific Applications, Inc. in Livermore, California.

Below we summarize our progress to date. In the future these models will continue to be developed by LSTC and supported by LSTC and our worldwide distributors.

Available LSTC Dummy, Headform, and Legform Models:

SID-IIs D,
EuroSID-2,
EuroSID-2re,
Hybrid III 50th percentile,
Hybrid III Rigid-FE Adults,
USSID,
Free Motion Headform,
Pedestrian Legforms.

These models are available at no additional cost to LS-DYNA customers through the LSTC ftp site. Contact sales@lstc.com.

SID-IIs D

LSTC has incorporated all initial customer feedback and the SID-IIs-D is released to all customers. The ongoing development has incorporated customer feedback from OEMs and an updated version will be released, soon.

EuroSID-2re
EuroSID-2

Joint development with DYNAmore

Development and validation of the initial model is completed. The first version of the EuroSID-2re and EuroSID-2 models are released to all customers.

Hybrid III 50th percentile

Joint development with NCAC

The validation of the initial model with adjusted material properties has been completed. The model stability and response were improved and an Alpha version has been released to customers. The future release of the Hybrid III 50th percentile dummy will incorporate additional validation and revalidation tests.

Hybrid III
Rigid-FE Adults

LSTC continues to improve these dummies and the model stability as well as the response had improved. All customer feedback has been incorporated and further improvement is planned, which will be in our future article update.

USSID

The USSID originally was developed based on the NHTSA public domain version of USSID. There have been major enhancements to this model including improved discretization for jacket, arm and pelvic foam, as well as improving the material data for foams. Additionally it has one global contact and a positioning tree for LS-PrePost.

Headform & Pedestrian Legforms

The Free Motion Headform to simulate upper interior head impact tests will soon incorporate a different way of modeling head skin – skull interaction as well as incorporation of material data from physical material tests.

The legforms was originally developed in 2001 based on the EEVC WG17

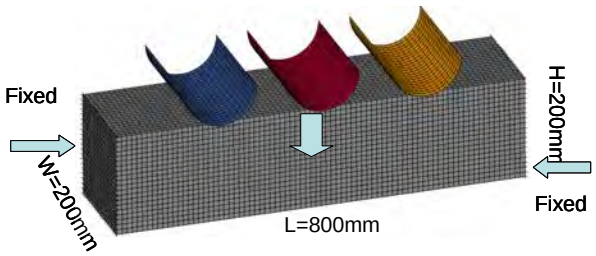
recommendations. Recently the Upper Leg Impactor and the Legform Impactor have been adjusted and revalidated according to the new European Regulation 631/2009.

Future LSTC Models

Dummy models in development at LSTC and/or joint interaction with other companies, universities, and interested parties:

EuroSID-2,
Hybrid III 3-year old,
Hybrid III 6-year old,
SID-IIs D Rigid-FE,
Hybrid III 5th percentile female,
Hybrid III 95th percentile.

December's Article will continue with Barrier Models and updates on the Dummy Models – release information



LS-OPT® / Topology

Now Released

Willem Roux, Tushar Goel

Livermore Software Technology Corporation is releasing a topology design product. the beta version has been released in November 2009, with version 1.0 being scheduled for a release in January 2010. For more information, download the distribution including the manual and example from the LSTC website, or contact either willem@lstc.com or tushar@lstc.com.

Design Goal and Problem Definition

The goal of topology optimization is to find the shape of a structure with the maximum utility of the material. For dynamic problems like crashworthiness simulations, this is achieved by designing for a uniform internal energy density in the structure while keeping the mass constrained.

The topology design problem is defined by (i) the allowable geometric domain, (ii) how the part will be used, and (iii) properties of the part such as manufacturing constraints. Additionally, you have to specify methodology requirements such as termination criteria and management of the LS-DYNA® evaluations. A GUI is provided to provide this information, schedule the design, and postprocess the results.

The Design Part

The initial part specifies the design domain – the optimum part computed will be inside the boundaries delimited by the initial part. The part must be modeled using *MAT_PIECEWISE_LINEAR_PLASTICITY using only eight-noded solid elements.

The part may contain holes; a structured mesh is accordingly not required and there is no node or element numbering convention as in other approaches. Design constraints such as being an extrusion may be specified.

The final shape of the part is described by the subset of the initial elements used. The use of an element is controlled by changing the amount of material in the element. This is achieved by assigning a design variable to the density of each element. The material is parameterized using a so-called density approach. In this approach, a design variable is directly linked to the individual material element such that each cell has its own material model. The design variable x, also known as relative density, varies from 0 to 1 where 0 indicates void and 1 represents the full material. The material properties corresponding to the values of design variables are obtained using an appropriate interpolation model as described in the theoretical manual.

This modified input deck is analyzed using LS-DYNA®. One can take advantage of multiple processors using the MPP version of LS-DYNA® and queuing systems.

Example

The example demonstrates the simulation with multiple load cases.

Problem Definition

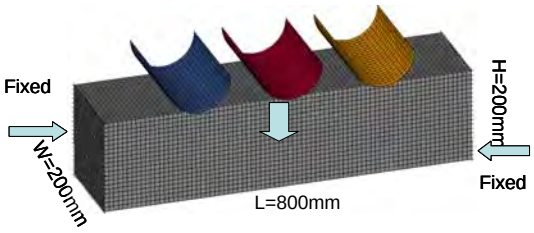


Figure 1: The geometry and loading conditions of the multiple load case example.

The geometry and loading conditions for the example are shown in Figure 1. This is fixed-fixed beam with three loads. The design part was meshed with 10mm3 elements.

Input

The three load cases were identified according to the location of the pole hitting the beam. Side load cases were assigned a unit weight and the center load was assigned a weight of three units. All cases were simulated using a cluster with PBS queuing system and eight processors per load were allocated. All simulations were run simultaneously. The desired mass fraction for this example was 0.3 and simulation status was reported every 90s. A maximum of 100 iterations were allowed.

Output

Convergence History

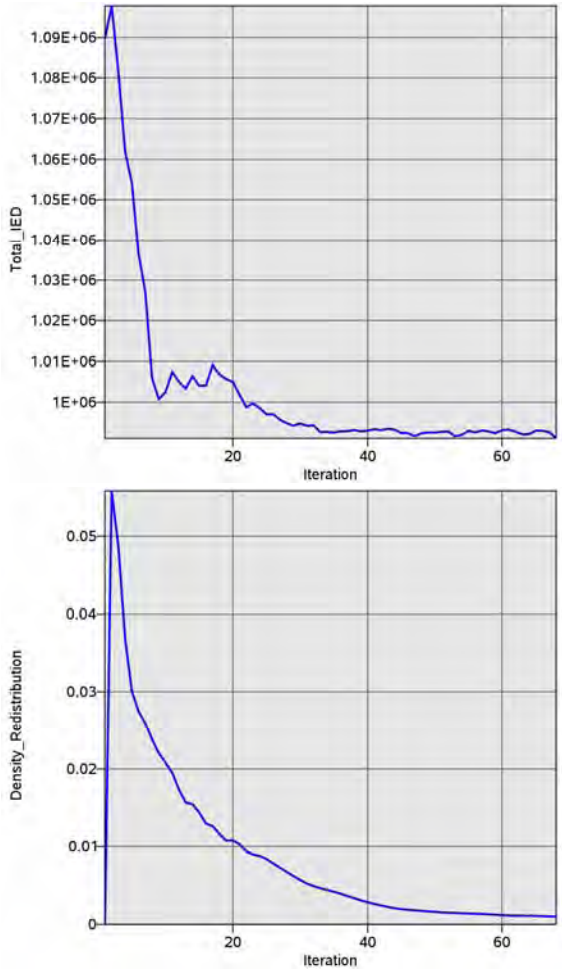


Figure 2: Convergence history for multiple-load case example.

The convergence history for the multiple-load example is shown in Figure 2. The simulation converged after 67 iterations, though miniscule changes were noted after 40 iterations. A monotonic reduction in the change in topology, characterized by the normalized Density_Redistribution graph, was observed. The final structure absorbed approximately 8% less total internal energy.

Density Contours

The initial and final structures are shown in Figure 3. The final structure evolved in a tabular structure with the two cross-members as legs. The structure had more material in the center section due to very high importance assigned to the center weight. There were many cavities in the structure such that the final structure could be considered equivalent to a truss-like structure as one would expect.

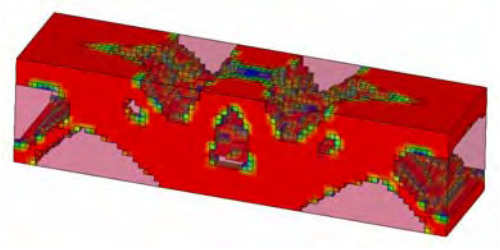


Figure 3: Initial and final density contours.

The evolution of the topology under multiple loading conditions is shown in Figure 4. While the final form of the structure was largely evolved by the 28th iteration (row 2, column 1), the material was re-distributed to remove the low density material and evolve a largely 0/1 (no material or full density material) structure.

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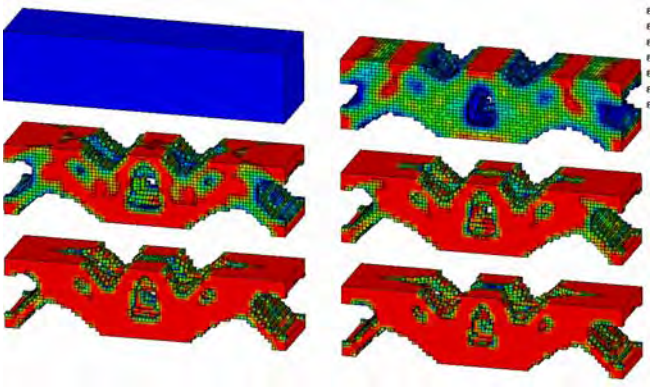


Figure 4: Evolution of the geometry for multiple-load case structure

The Official LS-OPT Support site

[http://www.lsoptsupport.com]

The Official LS-OPT Support site [http://www.lsoptsupport.com] is jointly monitored by DYNAmore GmbH (Germany) and LSTC (US)

The LS-OPT support site was jointly developed to keep you updated with current information. During January 2010 the site will be updated with

"Getting Started"
A first place to stop for new users to view the LS-OPTui and the basic procedures of optimization with LS-OPT.

How To's
A collection of information and examples for several tasks with LS-OPT

Documents
A collection of documents related to LS-OPT, Optimization and Stochastics

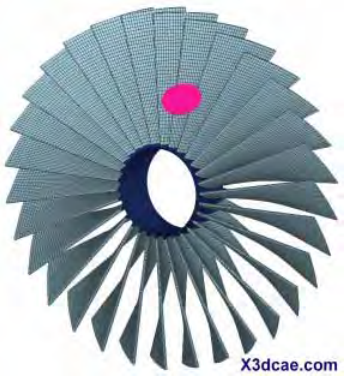
Examples
This Section demonstrates LS-OPT capabilities by means of a series of examples

Glossary
Alpha order to view definitions such as Anova, Bias error, Iteration and other technical terms.

Downloads
Downloads specific to LS-OPT

FAQ's
Questions related to Optimization, Robustness and Reliability Analysis
Answers are posted on the LS-OPT Support Site
http://www.lsoptsupport.com/faqs

News
Latest news relation to, or about LS-OPT



AVI Library Showcase

SPH BirdStrike

Courtesy

X3Dcae LLC

AVI Library 60b1 – 60b2 [http://www.feainformation.com]

X3Dcae LLC [http://www.X3Dcae.com]

Model Information:
Name: SPH birdstrike on Ti6Al4V rotating blades
Units: mm, Mg, sec, N, MPa, N-mm

SPH Bird Information:

- SPH bird size: small duck
- SPH bird long diameter 250 mm
- SPH bird short diameter 125 mm
- SPH bird grid: 3456 nodes with weighed mass built in LS-PrePost
- SPH bird mass: 0.00182774 Mg (1.83 kg)
- SPH bird material: MAT9_NULL + EOS4
- SPH bird Initial Velocity = 138,888.9 mm/sec (500 km/hour)
- rotating blades sheet metal thickness:3.00 mm
- rotating blades airfoil chord: 330.00 mm, max camber height: 12.00 mm
- rotor outer diameter: 1760 mm
- rotor blade material: MAT24_Ti6Al4V
- rotor core material: MAT20_steel
- rotor angular velocity: 546.64 rads/sec (5220 rpm)

X3Dcae LLC is the first and only CAE firm in West Virginia performing Finite Element Analysis with LS-DYNA since 2006

The services provided by X3Dcae LLC are LS-DYNA Analysis for Product Development and Industrial R&D, FEA training for CAE teams and High Quality Meshing

Among the Analysis Software: LS-DYNA
Meshing software : ANSA
Among the Analysis deck setup software: ANSA

X3DCAE LLC
128 Sun Valley, Morgantown, WV 26508
(304) 594-9343 phone - [info@X3Dcae.com]

FEATURED PAPER

Available On Line

Free Download of Papers from LS-DYNA Conferences - Service of LSTC and DYNAmore.

Development of a Flex-PLI LS-DYNA Model

Development of a Flex-PLI LS-DYNA Model

Shinya Hayashi - JSOL Corporation

Masahiro Awano, Isamu Nishimura - Mitsubishi Motors Corporation

A biofidelic flexible pedestrian legform impactor (Flex-PLI) has been developed by Japan Automobile Manufacturers Association, Inc. (JAMA) and Japan Automobile Research Institute (JARI). The Flex-PLI has good biofidelity as well as several knee ligament elongation measurement capabilities, three femur and four tibia bending moment measurement capabilities. For these reasons Flex-PLI is likely to be used for future pedestrian Global Technical Regulation. This paper introduces a finite element model of the Flex-PLI type GT for LS-DYNA and compares a full vehicle Flex-GT impact simulation with test. A very accurate vehicle model is needed to predict Flex- PLI injuries. In this paper, a detailed and correlated vehicle model was used. The Type GT is the 5th version of Flex-PLI and has almost the same structure and performance as final design type GTR. The Flex-PLI type GT LS-DYNA model was carefully created to ensure every important detail was included. Geometries, masses and material properties of all parts were reproduced from drawings and inspection of the real components. Connectivity and component interaction within the model was determined by thorough experiments. Accurate prediction of injury indices and kinematic behaviour was achieved by correlation to static and dynamic calibration tests. A fine mesh was used but reasonable calculation cost assured by imposing an analysis time step of 0.9 micro seconds.

http://www.dynalook.com/european-conf-2009/E-IV-02.pdf

Crash Test Dummy Models

Anthropomorphic Test Devices

Websites / Information

FEA Information

http://www.ls-dynadummymodels.com

LSTC's Models

http://www.lstc.com/models/

Arup Cellbond Barrier Models

http://www.oasys-software.com/dyna/en/fe-models/barrier.shtml

Arup Pedestrian Impactor Models

http://www.oasys-software.com/dyna/en/fe-models/pedestrian.shtml

Arup RCAR Barrier Model

http://www.oasys-software.com/dyna/en/fe-models/rcar.shtml

DYNAMore Models for

http://www.dummymodels.com

LS-DYNA Dummy Mailing List

sarba@lstc.com

Dr.Anupam Pal

Arup – OAYSIS – Nhance

And

Dr.Anupam Pal

(Dept of Biological Sciences and Bioengineering, Indian Institute of Technology,Kanpur India)

Assessment of Muscle Tone in Human Stomach using Finite Element Analysis

The gastrointestinal (GI) tract is a muscular conduit that extends from the mouth to the anus transporting, digesting and absorbing nutrients. Stomach is one of the most important of organs of the GI tract which works as a reservoir while ingestion of food, a grinder and mixer while digestion, and a controlled release device while supplying chyme to the small intestine Controlled release of food from stomach into small intestine is called gastric emptying. Gastric emptying depends upon nutritional content of food. Food is released into small intestine at a controlled rate such that small intestine can absorb the nutrients efficiently. Normal functioning of this process is primarily controlled by gastric muscle as muscular contractions cause flow in the stomach. Tonic contractions of stomach muscle increases muscle stress which results in marginally higher pressure in the stomach compared to intestine. This pressure difference drives gastric emptying. Therefore gastric muscle stress plays a direct and very important role in gastric emptying.

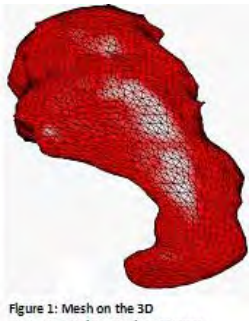


Figure 1: Mesh on the 3D reconstructed stomach geometry.

Any abnormality in gastric muscle relaxation and contraction during emptying leads to disorders like Gastroparesis or delayed gastric emptying, rapid gastric emptying and functional dyspepsia. Therefore it is important to assess stresses within the gastric wall during emptying and the elasticity of gastric muscle wall in order to understand the exact mechanism of gastric emptying. However direct assessment of gastric muscle stress and elasticity in vivo is very difficult in humans. Therefore an interdisciplinary approach which combines measurement of concurrent gastric geometry and intragastric pressure measurements with stress-strain analysis is required to assess muscle elasticity. From concurrent Magnetic Resonance (MR) Imaging (MRI) we reconstructed the 3D geometry of stomach from 2D segmented MR images

spanning the entire volume as shown in Fig. 1. On this mesh we apply pressure load as measured by fiber optic pressure recording system. In addition we also add hydrostatic pressure load on the wall. Figure 2A shows hydrostatic pressure for stomach geometry of an example study. Figure 2B shows pressure load which is summation of recorded pressure and hydrostatic pressure

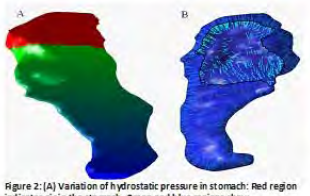
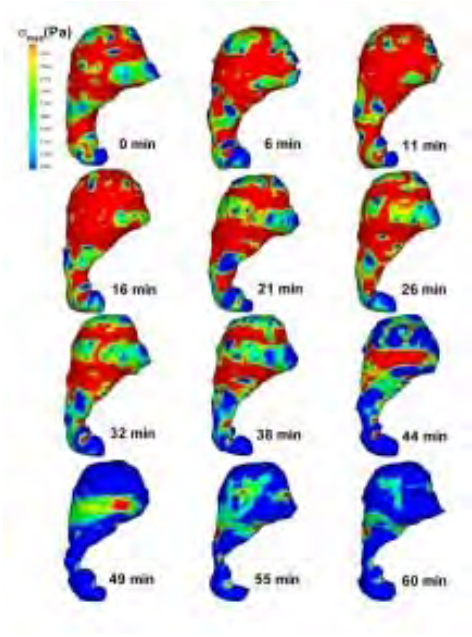


Figure 2: (A) Variation of hydrostatic pressure in stomach: Red region indicates air in the stomach. Green and blue regions show hydrostatic pressure. (B) Application of final pressure as load to each element along its normal direction shown by blue arrows.

Finite element analysis is done using LS-DYNA® software after applying input parameters such as thickness, load and nodal constraints on the stomach geometry for all volume scans of all subjects. Figure 3 shows the variation of average maximum principal stress on different volume scans during 1 hour period. Stomach changes from predominately red to predominately blue color which suggests that average maximum principal stress reduces as gastric emptying progresses. Stress distribution of particular volume is dependent on surface curvature with high curvature areas having low stresses and vice-versa.

Such detailed estimation and analysis of gastric muscle stress is one of a kind and throws light on the neuromuscular functioning of the stomach. When compared to diseases analyses the stresses can pin point the source of gastric functional disorders and hence can lead to better treatments



Courtesy: Dr.Anupam Pal (Dept of Biological Sciences and Bioengineering, Indian Institute of Technology,Kanpur India)

For any further information on this topic, Kindly contact us at india.support@arup.com

China News

1st Time
"Crashworthiness Simulation with LS-DYNA",
taught by Paul A. Du Bois

Training Courses by Shanghai Hengstar Technology Corp

By: Hongsheng Lu

The training course "Crashworthiness Simulation with LS-DYNA", taught by Paul A. Du Bois, has been successfully held at Shanghai, China by Shanghai Hengstar Technology Corp. (www.hengstar.com) on Oct. 21 to Oct. 24 2009.

This is the first time the advanced crashworthiness simulation course has been presented in China. We would like to thank LSTC and FEA information for their kind support and assistance in arranging this course. CAE engineers and professors from Geely, JCI, CNTNRC, NAST, PATAC, FTSS, TASS, DNS, Hunan University and others attended the seminar. All the attendees gave a very high evaluation of Paul's class content and presentation, especially for the contact and material model description. All attendees were fully satisfied with the results of the training class.

In response to their requests we will be conducting more courses, taught by CAE high level experts such as Paul A. Du Bois, LSTC Engineers, and experts from other software companies. We will provide this kind of training for the CAE engineering community and LS-DYNA users in China.

January 2010 – Training Class

A three days training class "LS-DYNA MPP, Airbag simulation with LS-DYNA, and LS-Prepost", taught by LSTC's Dr. Jason Wang, and Philip Ho, will be held at Shanghai from Jan. 25 to Jan. 27, 2010 by Hengstar Technology Corp. (www.hengstar.com).

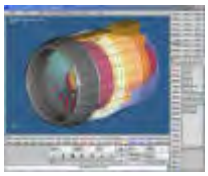
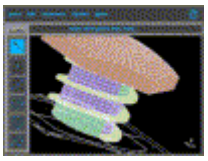
This course is responds to the requests from hardware companies (Dawning, Lenovo, etc.) and LS-DYNA MPP users who want to effectively use LS-DYNA MPP in their complex simulations such as crashworthiness, airbag deployment, stamping etc. New developments and features in LS-DYNA MPP and LS-PrePost will be covered. CAE engineers and professor from OEM, research center and university are very welcome to attend this course.

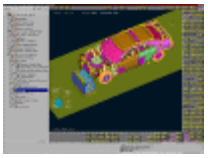
LS-PrePost, LS-OPT, LSTC's Barrier and Dummy Models are included with your LS-DYNA license at no additional fees. LS-PrePost training is given by the lead developer of LS-PrePost who leads a team of developers in the US and in China. LS-PrePost is fast becoming utilized in China and this course being taught by Philip Ho is an excellent way to learn. 30-day demonstration licenses are available to class attendees to practice what they have learned.

For the course 30-day demonstration license, for course practice contact hongsheng@hengstar.com

Additionally courses will be held through 2010. If you have a course you would like held please contact Hongsheng Lu to arrange on site training courses.

Courses can be tailored to your company engineering needs.



Pre Processing

Post Processing

Model Editing

A preprocessor is a program that processes its input data to produce output. This data is then used as input to another program.

BETA CAE Systems S.A.

http://www.beta-cae.gr/

Provides complete CAE pre- and post-processing solutions. ANSA, the world wide standard pre-processor and full product modeler for LS-DYNA, with integrated Data Management and Task Automation. μETA, a thriving innovative software with special features for the high performance and effortless 3D & 2D post-processing of LS-DYNA results.

Engineering Technology Associates, Inc.

http://www.eta.com

FEMB - Engineering Technology Associates' Finite Element Model Builder (FEMB) is a finite element pre- and post-processor for use with all major analysis codes and CAD Software.

Oasys, Ltd

http://www.oasys-software.com/dyna/en/

Oasys Primer is a model editor for preparation of LS-DYNA input decks. - Oasys D3Plot is a 3D visualization package for post-processing LS-DYNA analyses using OpenGL® (SGI) graphics.

JSOL Corporation

http://www.jsol.co.jp/english/cae/

JVISION is a general purpose pre-post processor for FEM software. Designed to prepare data for, as well as support, various types of analyses, and to facilitate the display of the subsequent results.

Livermore Software Technology Corporation

http://www.lstc.com

LS-PrePost is an advanced interactive program for preparing input data for LS-DYNA and processing the results from LS-DYNA analyses.

Educational Community

Global Connections

China

Tsinghua University
Dr. Qing Zhou

India

Indian Institute of Science
Dr. Anindya Deb

Italy

Prode – Elasis & Univ. of Napoli, Frederico II
Prof. Gennaro Monacelli

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University of Cincinnati
Dr. Ala Tabiei

University of Nebraska
Prof. John D. Reid

Connecticut State University
Prof. Thomas Vasko

LS-DYNA Distributors

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One Fee All Inclusive
LS-PrePost® - LS-OPT®
LSTC Dummy Models
LSTC Barrier Models

Alpha order by Country

Australia	Leading Eng. Analysis Providers - LEAP http://www.leapaust.com.au/ info@leapaust.com.au
CANADA	Corp. – MFAC http://www.mfac.com/ galb@mfac.com
CHINA	OASYS Ltd. (software house of Arup) http://www.oasys-software.com/dyna/en stephen.zhao@arup.com
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GERMANY	DYNAmore http://www.dynamore.de/ uli.franz@dynamore.de

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LSTC Barrier Models

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Italy	DYNAmore http://www.dynamore.de/ uli.franz@dynamore.de
JAPAN	JSOL Corporation http://www.jsol.co.jp/english/cae cae-info@sci.jsol.co.jp
JAPAN	ITOCHU Techno-Solutions Corp. http://www.engineering-eye.com/ ls-dyna@ctc-g.co.jp
JAPAN	FUJITSU http://jp.fujitsu.com\solutions\hpc\app\lsdyna\

LS-DYNA Distributors

LS-DYNA® Solution Package
One Fee All Inclusive
LS-PrePost® - LS-OPT®
LSTC Dummy Models
LSTC Barrier Models

Alpha order by Country

KOREA	Theme Engineering http://www.lsdyna.co.kr/ wschung@kornet.com
KOREA	Korean Simulation Tech. http://www.kostech.co.kr young@kostech.co.kr
Netherlands	Infinite Simulation Systems, BV http://www.infinite.nl/ j.mathjissen@infinite.nl
SWEDEN	Engineering Research AB http://www.erab.se/ sales@erab.se
TAIWAN	Flotrend Corporation http://www.flotrend.com.tw/ gary@flotrend.tw
RUSSIA	State Unitary Enterprise –STRELA info@ls-dynarussia.com

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LS-DYNA® Solution Package
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LSTC Dummy Models
LSTC Barrier Models

Alpha order by Country

United Kingdom	OVE ARUP & PARTNERS http://www.oasys-software.com/dyna/en/ dyna.sales@arup.com
USA	Livermore Software Tech. Corp. - LSTC http://www.lstc.com/ sales@lstc.com
USA	Engineering Tech. Assc. Inc. – ETA http://www.eta.com/ sales@eta.com
USA	DYNAMAX http://www.dynamax-inc.com/ sales@dynamax-inc.com

Finite Element Analysis (FEA) Consulting & Engineering Service

FEA consultants use a wide range of software simulation programs for controlling the modeling and analysis of structures, systems, products and many other applications. Used by government, homeland security, court trials, and many other industries.

North America

Karagozian & Case (K & C) http://www.kcse.com Shangrui Lan (818) 303-1268	**CAE Associates** http://www.caeai.com	**Schwer Engineering & Consulting Services** http://schwer.net Len Schwer (707) 837-0559
KBEC Khan Bui (512) 363-2739	**Predictive Engineering** http://www.predictiveengineering.com George Laird (800) 345-4671	

EU – Pacific Rim

AU **LEAP** http://www.leapaust.com Greg Horner 02 8966 7888	**UK** **ARUP** http://www.oasys-software.com/dyna/en/ Brian Walker 44 (0) 1212 133317	**UK** **Dutton Simulation** http://www.duttonsimulation.com Trevor Dutton 44 (0) 1926 732147

Software & Hardware Alliances

Software Solutions

SMP/MPP Hardware & OS

MPP & Interconnect MPI

ETA – DYNAFORM

http://www.eta.com

Includes a complete CAD interface capable of importing, modeling and analyzing, any die design. Available for PC, LINUX and UNIX, DYNAFORM couples affordable software with today's high-end, low-cost hardware for a complete and affordable metal forming solution.

ETA – VPG

http://www.eta.com

Streamlined CAE software package provides an event-based simulation solution of nonlinear, dynamic problems. eta/VPG's single software package overcomes the limitations of existing CAE analysis methods. It is designed to analyze the behavior of mechanical and structural systems as simple as linkages, and as complex as full vehicles.

OASYS software for LS-DYNA

http://www.oasys-software.com/dyna/en/

Oasys software is custom-written for 100% compatibility with LS-DYNA. Oasys PRIMER offers model creation, editing and error removal, together with many specialist functions for rapid generation of error-free models. Oasys also offers post-processing software for in-depth analysis of results and automatic report generation.

ESI Group Visual-CRASH For DYNA

http://www.esi-group.com

Visual-Crash for LS-DYNA helps engineers perform crash and safety simulations in the smoothest and fastest possible way by offering an intuitive windows-based graphical interface with customizable toolbars and complete session support. Being integrated in ESI Group's Open VTOS, an open collaborative multi-disciplinary engineering framework, Visual-Crash for DYNA allows users to focus and rely on high quality digital models from start to finish. Leveraging this state of the art environment, Visual Viewer, visualization and plotting solution, helps analyze LS-DYNA results within a single user interface.

Software & Hardware Alliances

Software Solutions

SMP/MPP Hardware & OS

MPP & Interconnect MPI

APTEK

http://www.aptek.com

The MMCD is a graphics-based and menu-driven program that interfaces with the LS-DYNA library of material models and the LS-OPT optimization code. The core of the MMCD is the driver, which calculates the stress-strain behavior of material models driven by combinations of strain increments and stress boundary conditions, i.e. pure shear stress, and combinations of uniaxial, biaxial, and triaxial compression and tension. MMCD input and output is accessed via pre- and post-processors; graphical user interfaces (GUIs) for easily selecting the material model parameters and load histories, and for plotting the output in both two (stress-strain curves) and three (yield surfaces) dimensions. The pre-processor, driver, and post-processor are combined into a web downloadable software package that operates seamlessly as a single code.

BETA CAE Systems S.A.– ANSA

http://www.beta-cae.gr

Is an advanced multidisciplinary CAE pre-processing tool that provides all the necessary functionality for full-model build up, from CAD data to ready-to-run solver input file, in a single integrated environment. ANSA is a full product modeler for LS-DYNA, with integrated Data Management and Process Automation. ANSA can also be directly coupled with LS-OPT of LSTC to provide an integrated solution in the field of optimization.

BETA CAE Systems S.A.– μETA

http://www.beta-cae.gr

Is a multi-purpose post-processor meeting diverging needs from various CAE disciplines. It owes its success to its impressive performance, innovative features and capabilities of interaction between animations, plots, videos, reports and other objects. It offers extensive support and handling of LS-DYNA 2D and 3D results, including those compressed with SCAI's FEMZIP software.

Participant Listing
For
LS-DYNA®

SMP & MPP Hardware and OS

SMP & MPP Hardware and OS

FUJITSU

Prime Power

SUN OS 5.8

NEC
SX6

Super-UX

SGI
Linux

Windows

INTEL	**INTEL**	**INTEL**
IA32	IA64	Xeon EMT64
Linux, Windows	Linux	Linux, Windows 64

HP	**HP**	**HP**	**HP**
	IA-64	Opteron	Alpha
PA-8X00			
	HP-UX 11.22	Linux	True 64
HP-UX 11.11. and above	and above		

Participant Listing

For S-DYNA®

MPP and Interconnect MPI

MPP and Interconnect MPI

Company	O/S	HPC Interconnect	MPI Software
CRAY			
CX1	Linux Windows HPC Server 2008,	InfiniBand	MSMPI, HP MPI, INTEL MPI
XT5	Linux	SeaStar2	Cray MPI
XT5M	Linux	SeaStar1	Cray MPI
FUJITSU			
Prime Power	SUN OS 5.8		
HP			
PA8000	HPUX		
IA64	HPUX		
NEC			
SX6	Super-UX		

Continued on next Page

Participant Listing

For S-DYNA®

MPP and Interconnect MPI

INTEL			
IA32	Linux, Windows	InfiniBand (Voltaire), MyriCom	MPICH, HP MPI, OpenMPI
IA64	Linux		MPICH, HP MPI, OpenMPI
Xeon EMT 64	Linux	InfiniBand (Voltaire), MyriCom, PathScale InfiniPath	MPICH, HP MPI, OpenMPI, INTEL MPI

SGI			
Altix 4700, 450	Linux	NUMAlink 4	SGI MPT, OpenMPI, Intel MPI, MPICH, Platform MPI 7 (HP-MPI)
Altix UV	Linux	NUMAlink 5	SGI MPT, OpenMPI, Intel MPI, MPICH, Platform MPI 5.6 (Scali MPI), 7 (HP-MPI)
Altix ICE	Linux	GigE QDR Mellanox Infiniband	SGI MPT, OpenMPI, Intel MPI, MPICH, Platform MPI 5.6 (Scali MPI), 7 (HP-MPI)
Altix XE	Linux & Windows	GigE QDR Mellanox Infiniband	SGI MPT, OpenMPI, Intel MPI, MPICH, Platform MPI 5.6 (Scali MPI), 7 (HP-MPI), MSMPI
CloudRack X2	Linux & Windows	GigE	SGI MPT, OpenMPI, Intel MPI, MPICH, Platform MPI 5.6 (Scali MPI), 7 (HP-MPI), MSMPI
Octane III	Linux & Windows	GigE QDR Mellanox Infiniband	SGI MPT, OpenMPI, Intel MPI, MPICH, Platform MPI 5.6 (Scali MPI), 7 (HP-MPI), MSMPI

Training Courses

LSTC CA & MI

Send listings to agiac99@aol.com

LSTC Training Classes - December 2009 through Q1

[http://www.lstc.com]

2009

December 08-11, 2009
California
MESH Free Methods (SPH and EFG)

December 10-11, 2009
Michigan
Advanced Options

December 15-18, 2009
Michigan
Introduction to LS-DYNA

2010

February 02-05, 2010
California
Introduction to LS-DYNA

February 17 - 19, 2010
California
ALE/Eulerian & Fluid Structure Interaction

March 16-19, 2010
Michigan
Introduction to LS-DYNA

March 25-26, 2010
Michigan
Implicit

Training Course

Blast Modeling

Penetration Modeling

Modeling & Simulation

Courses taught jointly by Paul A. Du Bois and Len Schwer

The LS-DYNA Blast & Penetration course has been updated and revised. Material has been continually added over the years and for 2010 the course has been divided into two complete separate classes. This allows time for each class to be covered comprehensively.

1. (2) two days on blast - Blast Modeling with LS-DYNA Applications to Protective Structures, Vehicles and Homeland Security

2. (2) two days on penetration - PENETRATION MODELING WITH LS-DYNA®: APPLICATIONS TO PROTECTIVE STRUCTURES, VEHICLES AND HOMELAND SECURITY THREATS

Additionally, a third class is being introduced in 2010:

MODELING & SIMULATION WITH LS-DYNA®: INSIGHTS INTO MODELING WITH A GOAL OF PROVIDING CREDIBLE PREDICTIVE SIMULATIONS

Compete descriptions of the courses can be found on the LSTC website

Training Courses

Send listings to agiac99@aol.com

Date is Class Start Date

Visit the company sites for updated information

DYNAmore Germany
[http://www.dynamore.de]

Introduction to LS-DYNA
December 02, 2009

Crash Analysis
December 01, 2009

LS-PP/DYNA Tools
December 11, 2009

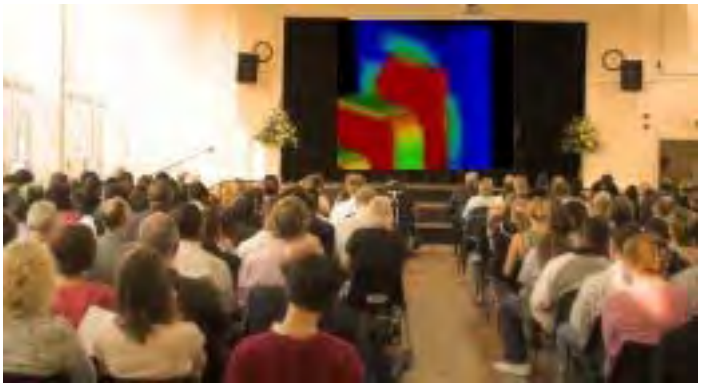
Composites
December 08, 2009

ETA – US
[http://www.eta.com]

Introduction to DYNAFORM
December 01, 2009
January 05
February 02
March 02
April 06
May 04

Introduction to LS-DYNA
December 09, 2009
January 14

Intro to Modeling with VPG/PrePost
December 08, 2009
January 12th, 2010



Conferences

Events

Symposiums

2010

Start	Country	
May 16	France	"Generalized/extended FEM, meshless and related approaches" http://www.eccm2010.org
June 06	US	11th LS-DYNA International Users Conference http://www.ls-dynaconferences.com
June 23	US	"Predictive Science and Technology in Mechanics and Materials." http://www.cavs.msstate.edu/symposium

To Be Announced for 2010:

EnginSoft (Italy) International Conference

THEME (Korea) Korean LS-DYNA User's Conference

JSOL (Japan) Asian LS-DYNA User's Conference

DYNAmore (Germany) 9th German LS-DYNA Forum

CADFEM (Germany) ANSYS Conference & 28th CADFEM Users Meeting

9th International Symposium
Computer Methods in Biomechanics and Biomedical Engineering

February 24-27, 2010

www.cmbbe2010.cf.ac.uk

Scope and objectives:

CMBBE2010 is to be held at the Westin Hotel, Valencia, Spain, 24–27 February 2010. The themes and topics for this 9th symposium in the series have been developed through interaction with international experts and therefore reflect the latest development in computer methods in biomechanics, biomedical technology and modelling of biological structures. Key objectives are to highlight and communicate new areas of future potential as well as presenting new techniques that are being successfully applied across medical technology, biomechanics and the healthcare sector. Interdisciplinary research which overarches medical technology, imaging/tissue characterisation, biosciences and applications in clinical practice will be placed at the forefront of the meeting agenda.

LSTC and Arup are two of the sponsors of the symposium.

Symposium Organisers:

John Middleton (Chair), Sam L Evans and Cathy Holt (Cardiff University, UK)

Christopher Jacobs (Columbia University, New York, USA)

Brian Walker (Arup, Birmingham, UK)

Carlos Atienza (IBV, Valencia, Spain)

- 30 Plenary presentations by keynote speakers
- 30 Oral and 6 poster presentation sessions
- Special sessions on emerging topics
- Software and medical technology exhibits
- Sponsored prizes for best research papers and posters

Young researchers are very welcome and reduced fee together with significant student prizes are offered

The meeting has always promoted international collaboration and networking and this is evidenced through the well-known research groups, commercial companies and scientific organisations who continue to present their research and support and sponsor the CMBBE series. If you wish to exhibit, sponsor or organise a special session then please do contact the organisers.

LS-DYNA users are invited to submit papers, where the code has been used in the fields of biomechanics and biomedical engineering.

The 11th International,
LS-DYNA® Users Conference

June 06-08, 2010

Hosted by Livermore SoftwareTechnology Corp.

To be held at The Hyatt Regency
Dearborn, MI

Abstract Due: January 14, 2010	**email abstract to: papers@lstc.com** **subject line for e-mail –** **Abstract LS-DYNA Conference 2010**	**Notification:** January 25, 2010
Paper Deadline: March 05, 2010	Conference Papers: The presenter of each accepted paper will receive free admission to the conference, provided that the presenter registers for a room at the Hyatt Regency Dearborn under LSTC Conference registration	

Application Areas Being Accepted for Paper Submission:

- Aerospace
- Automotive Crashworthiness
- Ballistic and Penetration
- Biomechanics
- Civil Engineering
- Compressible Fluid Dynamics
- Electro Magnetics
- Heat Transfer
- Impact and Drop Testing
- Manufacturing Processes
- Metal Forming
- Modeling Techniques
- Nuclear Applications
- Occupant Safety
- Seismic Engineering
- Ship Building
- Transportation
- Virtual Proving Ground

Abstract Length: Approximately 300 words, please include figures, if possible

Paper Length: Maximum of 3000 words, single-spaced, on 8-1/2" x 11" paper

Format: A MS Word template will be provided

Contact: papers@lstc.com

Livermore Software Technology Corp.
(925) 449-2500
http://www.ls-dynaconferences.com

Press Releases

Alpha Order

REVIEW & REFLECTIONS –
EnginSoft International Conference 2009, 1-2 October, Bergamo – Italy

CAE Technologies for Industry and ANSYS Italian Conference 2009

During the first days of October 2009, the city of Bergamo in Northern Italy, saw one of the largest gatherings of Virtual Simulation experts in the world. As many as 500 attendees from around the globe, from various industries, research and academic institutions came together to hear and discuss how CAE Computer-Aided Engineering and Virtual Simulation Technologies can innovate and perfect today's product development.

EnginSoft and ANSYS Italy had the great pleasure to welcome a most diverse audience of new simulation users and longtime experts, of industrial and academic professionals, researchers, CAE software developers and vendors, and engineers from nearly all disciplines.

They all brought an immense wealth of engineering and simulation expertise to the International Conference which will be remembered as a milestone and turning point for the simulation community in challenging times.

To many in the business and in attendance, the Conference motto:

"CAE Technologies for Industry" means first of all:

Fast ROI Return on Investment has never been more important !

In this spirit, the Plenary Speakers representing some of the world's leading engineering simulation technology providers: ANSYS, Flowmaster, ESTECO, Optimal Solutions Software, Magma, enthused the audience from the very beginning with highly innovative views and advancements. The subsequent parallel sessions featured applications of virtual simulation software and user knowledge across a variety of industrial sectors: Aerospace, Automotive, Oil&Gas, Marine, MCC, Power and Turbo, Industry Equipment..

Attendees could experience the latest technology advancements in hands-on sessions in the Demo Room.

What has always been clear for all those involved in Simulation and CAE, became even more evident in Bergamo: The implementation and application of state-of-the-art simulation tools in industry and research

is indispensable in order to:

• leverage knowledge and potentials

• speed up and perfect product and development processes

• achieve savings in time and resources

• stay competitive in an ever increasing global market

As in the past, the accompanying exhibition served as a networking forum to discuss applications, technology advancements, gain new insights, share experiences and find new business partners.

EnginSoft and ANSYS proudly welcomed Microsoft, E4 Computer Engineering and INTEC as Gold Sponsors, NAFEMS as the official patron of the event, and as exhibitors: CADFEM, CST, DISTENE, ELYSIUM, ESTECO, E-Xstream Engineering, FIGES, Flowmaster, Fraunhofer Institute for Algorithms and Scientific Computing SCAI, Intelligent Light, Magma, HP, Tecniche Nuove, The MathWorks, Transvalor…

The global approach of the 2009 Conference is a reflection of EnginSoft's growing presence in Europe and the USA and the company's major international collaborations. EnginSoft supports a wide network of experts consisting of key industrial companies, research centers and universities that maintain leading roles in their respective fields. The efforts of EnginSoft and its partners aim at fostering and strengthening the global CAE community in a true spirit of innovation.

To receive a copy of the Conference Proceedings or/and to enquire about the 2010 edition of the International Conference, please contact [eventi@enginsoft.it] [http://www.enginsoft.com]